

H. McRae

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APR 25 2001 #15

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1638

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/331,723A

DATE: 04/13/2001

TIME: 13:27:39

Input Set : A:\PTO.txt

Output Set: N:\CRF3\04122001\I331723A.raw

ENTERED

3 <110> APPLICANT: BOYNTON, John
4 GILLHAM, Nicholas
5 RANDOLPH-ANDERSON, Barbara
6 ISHIGE, Fumihiro
7 SATO, Ryo
9 <120> TITLE OF INVENTION: METHODS OF CONFERRING PPO-INHIBITING HERBICIDE RESISTANCE IN PLANTS BY
10 GENE MANIPULATION
12 <130> FILE REFERENCE: 2185-156P
14 <140> CURRENT APPLICATION NUMBER: US 09/331,723A
15 <141> CURRENT FILING DATE: 1999-08-18
17 <150> PRIOR APPLICATION NUMBER: PCT/US96/20415
18 <151> PRIOR FILING DATE: 1996-12-27
20 <160> NUMBER OF SEQ ID NOS: 24
22 <170> SOFTWARE: PatentIn version 3.0
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25 <211> LENGTH: 47
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27 <213> ORGANISM: Chlamydomonas reinhardtii
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30 <221> NAME/KEY: misc_feature
31 <223> OTHER INFORMATION: Strain CC-407
33 <220> FEATURE:
34 <221> NAME/KEY: PEPTIDE
35 <222> LOCATION: (1)...(47)
36 <223> OTHER INFORMATION: product = porphyric herbicide resistance domain
38 <400> SEQUENCE: 1
39 Ala Ala Glu Ala Leu Gly Ser Phe Asp Tyr Pro Pro Val Gly Ala Val
40 1 5 10 15
41 Thr Leu Ser Tyr Pro Leu Ser Ala Val Arg Glu Glu Arg Lys Ala Ser
42 20 25 30
43 Asp Gly Ser Val Pro Gly Phe Gly Gln Leu His Pro Arg Thr Gln
44 35 40 45
46 <210> SEQ ID NO: 2
47 <211> LENGTH: 46
48 <212> TYPE: PRT
49 <213> ORGANISM: Arabidopsis thaliana
51 <220> FEATURE:
52 <221> NAME/KEY: misc_feature
53 <223> OTHER INFORMATION: ecotype Columbia
55 <220> FEATURE:
56 <221> NAME/KEY: PEPTIDE
57 <222> LOCATION: (1)...(46)
58 <223> OTHER INFORMATION: product = porphyric herbicide resistance domain
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62 1 5 10 15
63 Ser Ile Ser Tyr Pro Lys Glu Ala Ile Arg Thr Glu Cys Leu Ile Asp

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65 Gly Glu Leu Lys Gly Phe Gly Gln Leu His Pro Arg Thr Gln
66          35          40          45
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70 <212> TYPE: PRT
71 <213> ORGANISM: Zea mays
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74 <221> NAME/KEY: misc_feature
75 <223> OTHER INFORMATION: Strain B73 inbred
77 <220> FEATURE:
78 <221> NAME/KEY: PEPTIDE
79 <222> LOCATION: (1)..(46)
80 <223> OTHER INFORMATION: product = porphyric herbicide resistance domain
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83 Ala Ala Asp Ala Leu Ser Arg Phe Tyr Tyr Pro Pro Val Ala Ala Val
84 1          5          10          15
85 Thr Val Ser Tyr Pro Lys Glu Ala Ile Arg Lys Glu Cys Leu Ile Asp
86          20          25          30
87 Gly Glu Leu Gln Gly Phe Gly Gln Leu His Pro Arg Ser Gln
88          35          40          45
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91 <211> LENGTH: 141
92 <212> TYPE: DNA
93 <213> ORGANISM: Chlamydomonas reinhardtii
95 <220> FEATURE:
96 <221> NAME/KEY: misc_feature
97 <223> OTHER INFORMATION: Strain CC-407
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100 <221> NAME/KEY: misc_feature
101 <222> LOCATION: (1)..(141)
102 <223> OTHER INFORMATION: encodes porphyric herbicide resistance domain
104 <400> SEQUENCE: 4
105 gccgccgagg ccctgggctc cttcgactac cgcgggtgg gcgcgtgac gctgtcgta 60
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107 cagctgcacc cgcgacgca g                                141
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111 <211> LENGTH: 138
112 <212> TYPE: DNA
113 <213> ORGANISM: Arabidopsis thaliana
115 <220> FEATURE:
116 <221> NAME/KEY: misc_feature
117 <223> OTHER INFORMATION: ecotype Columbia
119 <220> FEATURE:
120 <221> NAME/KEY: misc_feature
121 <222> LOCATION: (1)..(138)
122 <223> OTHER INFORMATION: encodes porphyric herbicide resistance domain
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126 ccgaaagaag caatccgaac agaatgtttg atagatggtg aactaaaggg ttttggcaa 120
 127 ttgcacatccac gcacgcaa 138
 130 <210> SEQ ID NO: 6
 131 <211> LENGTH: 138
 132 <212> TYPE: DNA
 133 <213> ORGANISM: Zea mays
 135 <220> FEATURE:
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 137 <223> OTHER INFORMATION: Strain B73 inbred
 139 <220> FEATURE:
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 141 <222> LOCATION: (1)..(138)
 142 <223> OTHER INFORMATION: encodes porphyric herbicide resistance domain
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 157 <222> LOCATION: (1)..(36)
 158 <223> OTHER INFORMATION: Oligonucleotide primer for Arabidopsis thaliana
 160 <400> SEQUENCE: 7
 161 ctatattacc caccaatggc agcagtatct atctcg 36
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 165 <211> LENGTH: 38
 166 <212> TYPE: DNA
 167 <213> ORGANISM: Artificial Sequence
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 170 <221> NAME/KEY: misc_feature
 171 <222> LOCATION: (1)..(38)
 172 <223> OTHER INFORMATION: Oligonucleotide primer for Zea mays
 174 <400> SEQUENCE: 8
 175 gattcttatta tccaccggatg gctgctgtaa ctgtttcg 38
 178 <210> SEQ ID NO: 9
 179 <211> LENGTH: 26
 180 <212> TYPE: DNA
 181 <213> ORGANISM: Artificial Sequence
 183 <220> FEATURE:
 184 <221> NAME/KEY: misc_feature
 185 <222> LOCATION: (1)..(26)
 186 <223> OTHER INFORMATION: Oligonucleotide primer common to both of A. thaliana and Z. mays
 187 porphyric herbicide resistance domain of PP
 189 <220> FEATURE:
 190 <221> NAME/KEY: misc_feature
 191 <222> LOCATION: (1)..(26)

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192 <223> OTHER INFORMATION: "n" residues can be inosine in addition to G, A, T or C; "k" at
193 position 1 is equal to G or T; "y" at positions 3 and 6 is equal
194 to C or T; "s" at positions 17 and 26 is equal to C or G; and "w"
195 at position 25 is equal to A or T

QUENCE: 9

26

nc cnatqgsnqc ngttnws

201 <210> SEQ ID NO: 10

202 <211> LENGTH: 2573

203 <212> TYPE: DNA

204 <213> ORGANISM: Chlamydomonas reinhardtii

204 <215> ORGANISM
206 <220> FEATURE:

207 <221> NAME/KEY: misc feature

207 <221> NAME/KEY: Misc_feature
208 <223> OTHER INFORMATION: Strain RS-3

208 <223> OTHER IM
210 <230> FEATURE:

211 <221> NAME/KEY: miss_features

211 <221> NAME/KEY: misc_featur
212 <222> LOCATION: 414-105524

212 <222> LOCATION: (1)..(2573)
213 <223> OTHER INFORMATION

213 <223> OTHER INFORM
215 100-574444-1

215 <400> SEQUENCE: 10
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218 tccatcccga ttccatccgc tcctcttccc ccacctagac tgtctaccgt ctaccagtt 180
219 cttgggcaat cattaacgta accccgcctc cctgcgcctg cccctccctc cctctcccc 240
220 ccgcacagcc cgccgcgcgg gaggccctgg gtccttgcga ctacccgcgg atgggcggc 300
221 tgacgctgtc gtacccgcgt agcgcgtgc gggaggagcg caaggcctcg gacgggtccg 360
222 tgccgggctt cggtcagctg caccgcgcga cgcaggtggg caagtgcgcg cgtgttgcgg 420
223 gcggtgtgtt goggagggga gggtgggtgg ggttgggggt ggggggtgggg gggattgggg 480
224 cgctgggtcg tatcccgccg ttgtatccctc ggcgtccctc catccatcc ccccttcaac 540
225 aacacacacg ggogcacaacg cacccttctt ggcgttactt tgtctggtc tccttaacac 600
226 actcttcgtc tcattttgtt gtcttctaac acacacactt gtccacacac agggcatcac 660
227 cactctggc accatctaca gtcgcgcct gttccccggc cgcgcgcggc agggccacat 720
228 gctgtgtc aactacatcg gggcaccac caaccgcggc atcgtaacc agaccaccga 780
229 gcagctgggt gaggcagggtgt gtgtgtgggg ggggtgggggg ggggcagtgg atttttggc 840
230 tgagccccctt gggcaaaaggc atccagggggg ggcgaagccc cccaggattt cccctgtccg 900
231 tgcgtgcgtg tgcgtgcgtg tgcacaaaaaa gtaccgtact ggcacaaaacc gcgagtgc 960
232 cgtattatta attgcacattt cctattgttag aaaaatagac ggcaggaaaaa actcgccgg 1020
233 agcgagaagc gacctgtga gtccatggac atcttgactt ttttcgttgc gcgagtata 1080
234 ctctcgcccc ctaaatatct tacatccatg tatcaaaaaca tgcacacac aagcgtctt 1140
235 gggcaagaat gtcgaaattt tttgcacacag ccaaaaccatg cttcccgag cttacatgt 1200
236 gtcgcggccc gggatcccgcc gccccggcccc ggttagccct ttgcgtgtct tgagtggat 1260
237 gtgggtgagg tgcattttggg atatcatggc ccgtgaagtg gctgtggtaa ggtggcgtgg 1320
238 cgtggcgggg acagggcatg tcgggtccct ggcacacgcg tggcttagt gccagtc 1380
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243 cacacacaca cacacacaca cacacacaca cacacacaca cacattttcg tcctgcagcc 1680
244 ccgaaccccg cggccgcgtt caccgttcc acctgccgca ccccccccccc tgccgcacgc 1740
245 ctgcgttcac cgcctctccc cccaccccat ctccctgcag gtggacaagg acctgcgcaa 1800
246 catggtcatc aagcccqacq cqcccaaqcc cctgtgtgtt ggcgtgcgcg tttggccggc 1860

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247	cggccatcccc caggtgtgag ggcgcagcag ccggaggat gggctagatc ctatgttctc	1920
248	aaagagactct acacccatat aacctcgacc tgcgaccttc gacctgataa cctggctgcc	1980
249	ccctcccaac cttagccacct ctcccccggat ttgggttcac tcggttgact tgctttggg	2040
250	ttcttggaaat aacttcacct gttgtatact ttgctgcact tctctgtacc actctttgoa	2100
251	ttaggttcgg ttttagttgg gctgcatgtg taaccctcc tcccccgcct gccacctgca	2160
252	gttcaacctg ggccacctgg agcagctgg caaggcgcgc aaggcgcctgg acgcggcggg	2220
253	gctgcaggc gtgcacctgg gggcaacta cgtcagcgtt gagcgcgtgg gcagcagcag	2280
254	cagcaggaag aggggagggg aggggagggg agggtaacaag gaggaggtt agcaggaggt	2340
255	ggtgctaagg cgcaaagcaa ggccgtgtt tatttcattt gactgaaacc gggaaaccca	2400
256	gcatgaacaa gaggtcaggg gactgcaagg agcggaggct acatgtatga ctaccccccga	2460
257	cgcgggcgtt gattccttga ctattggac ctatttcgtt gggctcgggc acatgacccc	2520
258	cctggccct tcgctgtatg gtgcccagcc gcccagccgc ccccccggcca cac	2573
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263	<212> TYPE: DNA	
264	<213> ORGANISM: Arabidopsis thaliana	
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267	<221> NAME/KEY: misc_feature	
268	<223> OTHER INFORMATION: ecotype Columbia	
270	<220> FEATURE:	
271	<221> NAME/KEY: CDS	
272	<222> LOCATION: (16)..(1629)	
273	<223> OTHER INFORMATION: product = protoporphyrinogen oxidase	
275	<400> SEQUENCE: 11	
276	ttctctgcga tttcc atg gag tta tct ctt ctc cgt ccg acg act caa tcg	51
277	Met Glu Ile Ser Leu Leu Arg Pro Thr Thr Gln Ser	
278	1 5 10	
279	ctt ctt ccg tcg ttt tcg aag ccc aat ctc cga tta aat gtt tat aag	99
280	Leu Leu Pro Ser Phe Ser Lys Pro Asn Leu Arg Leu Asn Val Tyr Lys	
281	15 20 25	
282	cct ctt aga ctc cgt ttt tca gtg gcc ggt gga cca acc gtc gga tct	147
283	Pro Leu Arg Leu Arg Cys Ser Val Ala Gly Gly Pro Thr Val Gly Ser	
284	30 35 40	
285	tca aaa atc gaa ggc gga ggc acc acc atc acg acg gat tgt gtg	195
286	Ser Lys Ile Glu Gly Gly Thr Thr Ile Thr Thr Asp Cys Val	
287	45 50 55 60	
288	att gtc ggc gga ggt att agt ggt ctt tgc atc gct cag gcg ctt gct	243
289	Ile Val Gly Gly Ile Ser Gly Leu Cys Ile Ala Gln Ala Leu Ala	
290	65 70 75	
291	act aag cat cct gat gct gct ccg aat tta att gtg acc gag gct aag	291
292	Thr Lys His Pro Asp Ala Ala Pro Asn Leu Ile Val Thr Glu Ala Lys	
293	80 85 90	
294	gat cgt gtt gga ggc aac att atc act cgt gaa gag aat ggt ttt ctc	339
295	Asp Arg Val Gly Gly Asn Ile Ile Thr Arg Glu Glu Asn Gly Phe Leu	
296	95 100 105	
297	tgg gaa gaa ggt ccc aat agt ttt caa ccg tct gat cct atg ctc act	387
298	Trp Glu Glu Gly Pro Asn Ser Phe Gln Pro Ser Asp Pro Met Leu Thr	
299	110 115 120	
300	atg gtg gta gat agt ggt ttg aag gat gat ttg gtg ttg gga gat cct	435

VERIFICATION SUMMARY

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